

REMARKS

In accordance with the foregoing, claims 1, 10, 15, 16, 18, 19, 22, 28, 30, 31, 34, 39, 40, 41, 42, 43, 45, 46 and 47 have been amended. The claims are amended to correct minor errors. No new matter is presented in this Amendment.

Response to Restriction

At page 2 of the Office Action, the Examiner required restriction between the following inventions:

- I. Claims 1 – 20, drawn to an electrolyte comprising a lithium salt, an organic solvent and an additive, classified in class 429, subclass 330;
- II. Claims 21, drawn to an electrolyte comprising a lithium salt, an organic solvent and at least one of the 5 additive compounds listed, classified in class 252, subclass 62.2.
- III. Claims 22 – 38, drawn to a lithium battery comprising a positive electrode that includes one of lithium-nickel-based and a lithium-nickel-manganese-based oxide, a negative electrode, an electrolyte comprising an additive, classified in class 429, subclass 231.1
- IV. Claims 39 – 44, drawn to an electrolyte comprising a lithium salt, an organic solvent comprising a carbonate and an aromatic hydrocarbon solvent, at least one additive and an organic sulfone-based compound, classified in class 429, subclass 332.
- V. Claims 45 – 48, drawn to a lithium secondary battery comprising a positive electrode, a negative electrode, an electrolyte comprising a lithium salt, an organic solvent, an additive and an organic sulfone-based compound, classified in class 429, subclass 215.

In response to the restriction requirement, Applicants elect **Group I, claims 1 – 20, with traverse.**

Applicants respectfully traverse the restriction requirement on the grounds the recited groups are not independent and distinct as required by 35 U.S.C. §121 and/or on the grounds that the Examiner has not shown that there would be a serious burden for the Examiner to examine all of the claims of the application.

In particular, regarding Groups I and II, claims 1 – 20 and 21 are clearly related and clearly belong together. Independent claim 1, as amended herein, is directed to a non-aqueous electrolyte of a lithium secondary battery comprising a lithium salt, an organic solvent and at

least one additive compound selected from a recited group. Independent claim 21 is directed to a non-aqueous electrolyte of a lithium secondary battery comprising a lithium salt, an organic solvent and at least one additive compound selected from a recited group that is a subgenus of the additive compounds that are generically recited in claim 1. Thus, claim 21 is similar, though not identical, to dependent claim 2, except that claim 21 is written in independent form.

Therefore, the two groups are overlapping in scope. In fact, the elected species with respect to Group I (as discussed below) reads on claim 21. Therefore, restriction between Group I and Group II is improper.

Likewise, Group I overlaps the scope of Group IV, claims 39 – 44. The independent claims of both groups are directed to a non-aqueous electrolyte of a lithium secondary battery comprising a lithium salt, an organic solvent and at least one additive compound selected from a recited group. The groups of additive compounds are recited identically in independent claim 1 and independent claim 39, as amended herein. Independent claim 39 of group IV further recites that the electrolyte contains an organic sulfone-based compound, which is recited in the same terms as in dependent claim 18 of Group I. Therefore, the Examiner has not shown that the inventions of Group I and Group IV are independent and distinct, and restriction is therefore improper.

Likewise, Group III, claims 22 - 38 overlaps the scope of Group V, claims 45 – 48. The independent claims of both groups are directed to a lithium secondary battery comprising a positive electrode including one of a material that reversibly intercalates/deintercalates lithium ions, and a material that reversibly forms a lithium-containing compound as a positive active material; a negative electrode including one of a lithium metal, a lithium-containing alloy, and a material that reversibly intercalates/deintercalates the lithium ions; and a non-aqueous that comprises a lithium salt, an organic solvent and at least one additive compound selected from a recited group. Contrary to what is alleged by the Examiner, Group III does not require that the lithium battery comprise a positive electrode that includes a lithium-nickel-based or a lithium-nickel-manganese-based oxide. Rather, this feature is recited only in a dependent claim, claim 23. The groups of additive compounds are recited identically in independent claim 22 and independent claim 45, as amended herein. Independent claim 45 of group V further recites that the electrolyte contains an organic sulfone-based compound, which is recited in the same terms as in dependent claim 30 of Group III. Therefore, the Examiner has not shown that the inventions of Group III and Group V are independent and distinct, and restriction is therefore

improper.

Regarding the lithium secondary battery claims versus the non-aqueous electrolyte claims, as discussed above, Groups I, II and IV are directed to a non-aqueous electrolyte of a lithium secondary battery comprising a lithium salt, an organic solvent and at least one additive compound selected from a recited group, whereas Groups III and V are directed to a lithium secondary battery that, among other features, includes the non-aqueous electrolyte. The specific features of the non-aqueous electrolyte that is the subject matter of independent claim 1, as amended herein, are required by independent claim 22, as amended herein. Therefore, the Examiner has not shown that the inventions of Group I and Group III are independent and distinct, and restriction is therefore improper. The specific features of the non-aqueous electrolyte that is the subject matter of independent claim 39, as amended herein, are required by independent claim 45, as amended herein. Therefore, the Examiner has not shown that the inventions of Group IV and Group V are independent and distinct, and restriction is therefore improper. Since it is shown above that restriction between Groups I, II and IV is improper, and Groups III and V is improper, it is respectfully submitted that the all of the restrictions in this application should be withdrawn.

Moreover, Examiner has not shown that there would be a serious burden for the Examiner to examine all of the claims of the application. For example, a thorough search of the electrolyte according to independent claim 1 of Group I, as amended herein, would provide a search for this same feature in the remaining Groups II, III, IV and V, particularly since the electrolyte feature is identically recited in independent claims 22, 39 and 45, as amended herein. Reconsideration and withdrawal of the restriction requirement are therefore respectfully requested for this additional reason.

Response to Election of Species

At page 4 of the Office Action, the Examiner alleged that the application contains claims directed to patentably distinct species and required an election of species, depending on the elected Group. In particular, the Examiner stated that if Group I is elected, then an election of species would be required of the additives of Formulas (1) to (6) and that the substituents of the formula be further defined. The Examiner further required an election of whether the additive compound forms a passivation layer according to claim 7. The Examiner further required an election of the non-aqueous solvent from claims 10 – 16 or 28 as a carbonate according to

claims 11 and 35, as a mixed solvent of a cyclic carbonate and a chain carbonate according to claims 12 and 36, or as a mixed solvent of a carbonate solvent and an aromatic hydrocarbon solvent according to claims 14 – 15 and 37 – 38 or is an ester, ether or ketone. The Examiner further required an election of whether or not an organic sulfone-based compound according to claims is present.

In response, applicants elect the **additive of formula (1) wherein R1 and R2 are hydroxy, and R3 and R4 are methyl (in other words, the compound bisphenol A).**

Applicants further elect that **the additive forms a passivation layer according to claim 7.**

Applicants further elect that **the solvent is a mixed solvent of a cyclic carbonate and a chain carbonate.**

Applicants further elect that **an organic sulfone-based compound is not present.**

Claims 1 – 10, 12 and 21 read on the elected species.

The requirement of election of species is traversed on the grounds that there would not be a serious burden on the Examiner to search and examine all of the species of the application. Reconsideration and withdrawal of the requirement for election of species are therefore respectfully requested.

Conclusion

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition for allowance.

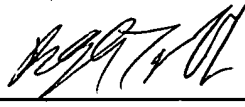
If any further fees are required in connection with the filing of this Amendment, please charge the same to our deposit account number 503333.

Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney.

Respectfully submitted,

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